

AMENDMENT TO THE CLAIMS:

This listing of claims will replace all prior versions of claims in the application.

LISTING OF CLAIMS:

1. (Original) Apparatus for delivering laser energy to a workpiece, comprising:
at least one laser energy source providing at least one laser beam;
a plurality of laser beam modules arranged to selectably steer said at least one laser beam to a plurality of target sub-areas on a workpiece, which together cover a target area, said plurality of laser beam modules being additionally operative to focus said at least one laser beam on said workpiece without an intervening f-theta lens.
2. (Currently Amended) Apparatus for delivering laser energy to a workpiece as claimed in claim 1—~~and~~, wherein said at least one laser energy source comprises a laser and a laser beam splitter operative to convert an output of said laser into a plurality of laser beams.
3. (Currently Amended) Apparatus for delivering laser energy to a workpiece as claimed in claim 1—~~and~~, wherein said at least one laser energy source comprises a laser and a laser beam director operative to receive an output of said laser and to provide a plurality of individually directed laser beams.
4. (Currently Amended) Apparatus for delivering laser energy to a workpiece as claimed in claim 1—~~and~~, wherein said laser energy source comprises a laser and an AOD operative to split an output of said laser into a selectable number of laser beams and to individually direct each laser beam to a selectable location.

5. (Currently Amended) Apparatus for delivering laser energy to a workpiece as claimed in claim 1~~and~~, wherein said laser beam modules comprise:

at least one laser beam steering module operative to steer at least one laser beam to a selectable location on said workpiece; and

at least one laser beam focusing optical module upstream of said at least one laser beam steering module operative to focus said at least one laser beam onto said workpiece.

6. (Currently Amended) Apparatus for delivering laser energy to a workpiece as claimed in claim 1~~and~~, wherein said laser beam modules comprise:

at least one laser beam steering module operative to steer at least one laser beam to a selectable location on said workpiece and to selectively extend or retract to compensate for an actual distance to said selectable location to thereby deliver said at least one laser beam in focus onto said workpiece.

7. (Currently Amended) Apparatus for delivering laser energy to a workpiece as claimed in claim 5~~and~~, wherein said at least one laser beam module comprises a plurality of laser beam steering modules arranged in an array, each laser beam steering module is operative to steer a laser beam to a selectable location in a corresponding target sub-area.

8. (Currently Amended) Apparatus for delivering laser energy to a workpiece as claimed in claim 7~~and~~, wherein each laser beam steering module is operative to steer a laser beam to a selectable location independent of other laser beam steering modules.

9. (Currently Amended) Apparatus for delivering laser energy to a workpiece as claimed in claim 7~~and~~, wherein an at least one laser beam focusing optical module operates in coordination with a corresponding laser beam steering module, and wherein

said at least one focusing optical module is operative to focus a laser beam onto said workpiece at said selectable location.

10. (Currently Amended) Apparatus for delivering laser energy to a workpiece as claimed in claim 8~~and~~, wherein said at least said one laser beam module comprises a plurality of laser beam steering modules and a corresponding plurality of laser beam focusing optical modules, and wherein each said at least one laser beam focusing optical module is operative to focus a laser beam to any selectable location in a corresponding target sub-area.

11. (Currently Amended) Apparatus for delivering laser energy to a workpiece as claimed in claim 7~~and~~, wherein said plurality of laser beam modules includes at least one redundant laser beam module.

12. (Currently Amended) Apparatus for delivering laser energy to a workpiece as claimed in claim 11~~and~~, wherein said at least one laser beam is pulsed and wherein:

during an initial pulse, a first laser beam steering module is operative to steer a laser beam in focus to a first selectable location, and

during a subsequent pulse, a second laser beam steering module is operative to steer at least one laser beam in focus to a second selectable location different from said first selectable location.

13. (Currently Amended) Apparatus for delivering laser energy to a workpiece as claimed in claim 5~~and~~, wherein said at least one laser beam steering module is arranged to selectably steer an at least one laser beam to said selectable location in a corresponding target sub-area, at least some selectable locations in said target sub-area being located at differing focusing distances from a corresponding at least one focusing optical module.

14. – 72. (Cancelled)

73. (Original) Apparatus for delivering laser energy to an electrical circuit substrate, comprising:

at least one laser beam source simultaneously outputting a plurality of laser beams;

a plurality of independently steerable laser beam deflectors disposed between said at least one laser beam source and said electrical circuit substrate to direct said plurality of laser beams to impinge on said electrical circuit substrate at independently selectable locations; and

focusing optics operative to focus said plurality of laser beams to different independently selectable locations without f- \emptyset optical elements.

74. (Currently Amended) The apparatus claimed in claim 73~~and~~, wherein said at least one laser beam source comprises a laser outputting a first laser beam, and at least one beam splitter splitting said first laser beam into said plurality of laser beams.

75. (Currently Amended) The apparatus claimed in claim 74~~and~~, wherein said beam splitter comprises an acousto-optical deflector.

76. (Currently Amended) The apparatus claimed in claim 75~~and~~, wherein said acousto-optical deflector is operative to split said first laser beam into said plurality of laser beams, and to direct each laser beam to an independently selectable direction among a plurality of independently selectable locations.

77. (Currently Amended) The apparatus claimed in claim 73~~and~~, wherein said focusing optics comprises at least one movable optical element.

78. – 113. (Cancelled)

114. (Original) A method for delivering laser energy to a workpiece, comprising:
providing at least two laser beams;
selectably steering said at least two laser beams to a plurality of target sub-areas on a workpiece, together covering a target area on a workpiece; and
independently focusing said at least two laser beams on said workpiece without an intervening f-theta lens between a beam steering device and said target area.

115. (Currently Amended) The method claimed in claim 114~~and~~, wherein said providing at least two laser beams comprises:
converting an output of a laser beam into at least two laser beam segments.

116. (Currently Amended) The method claimed in claim 114~~and~~, wherein said providing at least two laser beams comprises:
supplying a laser beam to a laser beam director; and
outputting a plurality of individually directed laser beams.

117. (Currently Amended) The method claimed in claim 114~~and~~, wherein said providing at least two laser beams comprises:
supplying a laser beam to an acousto-optical device (AOD);
splitting said laser beam into a selectable number of laser beam segments; and
individually directing each laser beam segment to a selectable location.

118. (Currently Amended) The method claimed in claim 114~~and~~, wherein said selectably steering comprises:
receiving each laser beam at a laser beam steering module; and

pivoting a reflector associated with said laser beam steering module to steer a laser beam to a selectable location on said workpiece.

119. (Currently Amended) The method claimed in claim 118~~—and~~, wherein said independently focusing comprises:

receiving each laser beam at a focusing optical module upstream of a laser beam steering module;

moving an optical element in said focusing optical module to focus a laser beam onto said workpiece.

120. (Currently Amended) The method claimed in claim 118~~—and~~, wherein said independently focusing comprises:

moving said reflector along an axis to compensate for an actual distance to said selectable location to deliver said at least one laser beam in focus onto said workpiece.

121. (Currently Amended) The method claimed in claim 118~~—and~~, wherein said receiving each laser beam at a laser beam steering module comprises:

receiving each laser beam at a laser beam steering module in an array of laser beam steering modules, said steering module providing said selectable steering functionality.

122. (Currently Amended) The method claimed in claim 121~~—and~~, wherein said selectably steering comprises steering a laser beam to a selectable location independent of other laser beams.

123. (Currently Amended) The method claimed in claim 121~~—and~~, further comprising:

focusing a laser beam coordination with said selectably steering said laser beam such that said laser beam is delivered in focus onto said workpiece at said selectable location.

124. (Currently Amended) The method claimed in claim 118~~—and~~, wherein said receiving each laser beam at a focusing optical module comprising:

receiving each laser beam at a focusing optical module in an array of focusing optical modules, each focusing optical module corresponding to a laser beam steering module in an array of laser beam steering modules;

steering each laser beam to a selectable location in a target sub-area; and
delivering each laser beam in focus to each said selectable location.

125. (Currently Amended) The method claimed in claim 118~~—and~~, further comprising:

not receiving any laser beam at at least one redundant laser beam steering module.

126. (Currently Amended) The method claimed in claim 118~~—and~~, further comprising:

not receiving any laser beam at at least one redundant focusing optical module.

127. (Currently Amended) The method claimed in claim 125~~—and~~, further comprising:

not receiving any laser beam at at least one redundant focusing optical module.

128. (Currently Amended) The method claimed in claim 127~~—and~~, wherein said providing at least two laser beams comprises:

providing at least two pulsed ser beams;

during an initial pulse, steering a first laser beam in focus to a first selectable location, and

during a subsequent pulse, steering a second laser beam in focus to a second selectable location different from said first selectable location.

129. (Currently Amended) The method claimed in claim 118~~—and~~, wherein said selectably steering further comprises:

steering at laser one laser beam to a selectable location in a target sub-area, at least some selectable locations in said target sub-area being located at differing focusing distances from a corresponding focusing optical module.

130. – 187. (Cancelled)

188. (Original) A method for delivering laser energy to an electrical circuit substrate, comprising:

simultaneously outputting a plurality of laser beams from a laser beam source;
independently steering said plurality of laser beams to impinge on said electrical circuit substrate at independently selectable locations; and
focusing said plurality of laser beams to different independently selectable locations without f- \emptyset optical elements.

189. (Currently Amended) The method claimed in claim 188~~—and~~, wherein said simultaneously outputting comprises outputting a first laser beam, and splitting said first laser beam into said plurality of laser beams.

190. (Currently Amended) The method claimed in claim 189~~—and~~, wherein said splitting comprises splitting said first laser beam with an acousto-optical deflector.

191. (Currently Amended) The method claimed in claim 190~~—and~~, wherein said splitting comprises directing ones of said plurality of laser beams in independently selectable directions.

192. (Currently Amended) The method claimed in claim 188~~—and~~, wherein said focusing comprises moving at least one optical element.

193. – 213. (Cancelled)

214. (Original) A method for manufacturing an electrical circuit, comprising:
delivering laser energy to an electrical circuit substrate, said delivering including:
providing at least two laser beams;
selectably steering said at least two laser beams to a plurality of target sub-areas on said electrical circuit substrate, together covering a target area on said electrical circuit substrate; and
independently focusing said at least two laser beams on said electrical circuit substrate without an intervening f-theta lens between a beam steering device and said target area; and
performing at least one additional electrical circuit manufacturing operation on said electrical circuit substrate.

215. (Currently Amended) The method claimed in claim 214~~—and~~, wherein said providing at least two laser beams comprises:
converting an output of a laser beam into at least two laser beam segments.

216. (Currently Amended) The method claimed in claim 214~~—and~~, wherein said providing at least two laser beams comprises:
supplying a laser beam to a laser beam director; and
outputting a plurality of individually directed laser beams.

217. (Currently Amended) The method claimed in claim 214~~and~~, wherein said providing at least two laser beams comprises:

- supplying a laser beam to an acousto-optical device (AOD);
- splitting said laser beam into a selectable number of laser beam segments; and
- individually directing each laser beam segment to a selectable location.

218. (Currently Amended) The method claimed in claim 214~~and~~, wherein said selectably steering comprises:

- receiving each laser beam at a laser beam steering module; and
- pivoting a reflector associated with said laser beam steering module to steer a laser beam to a selectable location on said electrical circuit substrate.

219. (Currently Amended) The method claimed in claim 218~~and~~, wherein said independently focusing comprises:

- receiving each laser beam at a focusing optical module upstream of a laser beam steering module;
- moving an optical element in said focusing optical module to focus a laser beam onto said electrical circuit substrate.

220. (Currently Amended) The method claimed in claim 218~~and~~, wherein said independently focusing comprises:

- moving said reflector along an axis to compensate for an actual distance to said selectable location to deliver said at least one laser beam in focus onto said electrical circuit substrate.

221. (Currently Amended) The method claimed in claim 218~~and~~, wherein said receiving each laser beam at a laser beam steering module comprises:

receiving each laser beam at a laser beam steering module in an array of laser beam steering modules, said steering module providing said selectable steering functionality.

222. (Currently Amended) The method claimed in claim 221~~—and~~, wherein said selectably steering comprises steering a laser beam to a selectable location independent of other laser beams.

223. (Currently Amended) The method claimed in claim 221~~—and~~, further comprising:

focusing a laser beam in coordination with said selectably steering said laser beam such that said laser beam is delivered in focus onto said electrical circuit substrate at said selectable location.

224. (Currently Amended) The method claimed in claim 218~~—and~~, wherein said receiving each laser beam at a focusing optical module comprising:

receiving each laser beam at a focusing optical module in an array of focusing optical modules, each focusing optical module corresponding to a laser beam steering module in an array of laser beam steering modules;

steering each laser beam to a selectable location in a target sub-area; and
delivering each laser beam in focus to each said selectable location.

225. (Currently Amended) The method claimed in claim 218~~—and~~, further comprising:

not receiving any laser beam at at least one redundant laser beam steering module.

226. (Currently Amended) The method claimed in claim 218—~~and~~, further comprising:

not receiving any laser beam at at least one redundant focusing optical module.

227. (Currently Amended) The method claimed in claim 225—~~and~~, further comprising:

not receiving any laser beam at at least one redundant focusing optical module.

228. (Currently Amended) The method claimed in claim 227—~~and~~, wherein said providing at least two laser beams comprises:

providing at least two pulsed laser beams;

during an initial pulse, steering a first laser beam in focus to a first selectable location, and

during a subsequent pulse, steering a second laser beam in focus to a second selectable location different from said first selectable location.

229. (Currently Amended) The method claimed in claim 218—~~and~~, wherein said selectably steering further comprises:

steering at laser one laser beam to a selectable location in a target sub-area, at least some selectable locations in said target sub-area being located at differing focusing distances from a corresponding focusing optical module.

230. – 287. (Cancelled)

288. (Original) A method for manufacturing an electrical circuit substrate, comprising:
delivering laser energy to an electrical circuit substrate, said delivering including:

simultaneously outputting a plurality of laser beams from a laser beam source;

independently steering said plurality of laser beams to impinge on said electrical circuit substrate at independently selectable locations; and

focusing said plurality of laser beams to different independently selectable locations without f- θ optical elements; and

performing at least one additional electrical circuit manufacturing operation on said electrical circuit substrate.

289. (Currently Amended) The method claimed in claim 288~~—and~~, wherein said simultaneously outputting comprises outputting a first laser beam, and splitting said first laser beam into said plurality of laser beams.

290. (Currently Amended) The method claimed in claim 289~~—and~~, wherein said splitting comprises splitting said first laser beam with an acousto-optical deflector.

291. (Currently Amended) The method claimed in claim 290~~—and~~, wherein said splitting comprises directing ones of said plurality of laser beams in independently selectable directions.

292. (Currently Amended) The method claimed in claim 288~~—and~~, wherein said focusing comprises moving at least one optical element.

293. – 313. (Cancelled)